



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,516	07/14/2004	Graham Cross	CH920010024US1 (8728-698)	6389
46069	7590	06/01/2007	EXAMINER	
F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			PHAM, THANHHA S	
			ART UNIT	PAPER NUMBER
			2813	
			MAIL DATE	DELIVERY MODE
			06/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/501,516

Applicant(s)

CROSS ET AL.

Examiner

Thanhha Pham

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-47, 52-55, 57 and 58 is/are rejected.
- 7) ☒ Claim(s) 48-51 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 02/05/2007.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 32-35 and 58 are rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brown et al [US 6,340,822].

► With respect to claims 32 and 34-35, Brown et al (figs 1-6, cols 1-10) discloses the claimed method forming a microstructure, comprising:

depositing a seed material (26, fig 2, col 4) on a substrate (22), wherein the substrate is formed from one of silicon, glass, quartz, ceramics and plastic;

growing a nanotube (14", fig 2) from the seed material;

depositing microstructure material (30, fig 3B) on the substrate to embed the nanotube (14") in the microstructure material, the microstructure material comprises a different material form the nanotube; and

detaching the substrate (22, fig 5B-5C, col 9 lines 25-29) to release the microstructure.

► With respect to claim 33, the microstructure material (30) would be shaped (having a shape as in fig 3B) prior to the step of detaching the substrate to release the microstructure (fig 5C).

► With respect to claim 58, interpreting the claim in a broad scope that the sacrificial layer and the microstructure material are formed of the same material, Brown et al (figs 1-6, cols 1-10) discloses the claimed method forming a microstructure, comprising:

depositing a seed material (26, fig 2, col 4) on a substrate (22);
growing a nanotube (14", fig 2) from the seed material;
depositing microstructure material (top portion of layer 30, fig 3B) on the substrate to embed the nanotube (14") in the microstructure material; and
detaching the substrate (22, fig 5B-5C, col 9 lines 25-29) to release the microstructure, wherein detaching comprising depositing a sacrificial layer (bottom portion of layer 30) on a surface of the substrate prior to deposition of the microstructure material (top portion of layer 30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 36-47 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al [US 6,340,822] in view of Gimzewski et al [US 2002/0130610].

► With respect to claim 36-39 and 57, Brown et al substantially discloses the claimed method but does not expressly teach the seed material comprising alternating layers of a first precursor material and a second precursor material, wherein the first precursor material comprises a fullerene material comprising carbon 60 and the second precursor material comprises field sensitive material wherein the field sensitive material comprises Ni.

However, Gimzewski et al teaches using the seed material comprising alternating layers of a first precursor material and a second precursor material, wherein the first precursor material comprises a fullerene material comprising carbon 60 and the second precursor material comprises field sensitive material wherein the field sensitive material comprises Ni.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process of Brown et al by using the seed material as being claimed, per taught by Gimzewski et al to provide improved characteristics of stable nanotube (see Gimzewski et al, text [0054]) for microstructure.

► With respect to claims 40, 43, 46 and 47, as reasons given above, Gimzewski et al teaches growing the nanotube comprising heating the substrate in vacuum conditions

Art Unit: 2813

and applying a field of electric field/magnetic field (17, fig 2, text [0035]-[0037]) orthogonally to the surface of substrate.

► With respect to claims 41-42 and 45, parameters for growing the nanotube is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art. As noted in *In re Aller* 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

See also In re Waite 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

3. Claims 52-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al [US 6,340,822] in view of Niedermann et al [US 5,994,100].

Art Unit: 2813

► With respect to claims 52-53, Niedermann et al (figs 4B-4C, col 7-8) teaches depositing of the seed material comprises: depositing a photoresist layer on the substrate; forming an aperture in the photoresist layer wherein forming of the aperture comprise under-etching the photoresist layer to produce a cavity in the photoresist layer (developing photoresist layer); masking the substrate with the photoresist layer (22c) to locate the seed material at a site on the substrate defined by the aperture; and removing the photoresist layer to remove surplus seed material.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process Brown et al to deposit the seed material as taught by Niedermann et al as being claimed to provide appropriate site of seed material on the substrate for growing the nanotube for making the microstructure.

► With respect to claim 54-55, Niedermann et al (figs 4B-4C, col 7-8 & col 5 lines 36-60) shows forming a tip image (13c, fig 4B) in the substrate to produce a mold for receiving the microstructure material wherein forming of the tip image comprises: depositing a photoresist layer on the substrate; forming an aperture in the photoresist layer; and under etching the substrate beneath the photoresist layer to create the tip image (photo etch using mask – col 5 lines 38-60).

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process Brown et al to form the tip image as taught by Niedermann et al as being claimed to provide appropriate microdevice from the microstructure.

Allowable Subject Matter

4. Claims 48-51 and 56 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/501,516

Page 8

Art Unit: 2813

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TSP

A handwritten signature in black ink, consisting of a series of loops and a final vertical stroke, positioned above a horizontal line.

THANHHA S. PHAM
PRIMARY EXAMINER